

**72501**  
**Landslide Soil**  
**1061 grams**

*DRAFT*

### Introduction

72501 is a soil sample collected about 5 meters from boulder 2 at station 2 on the landslide off of the South Massif at Apollo 17. It contained one rock fragment 72505. A large rake sample (72535-559) was collected adjacent to this soil sample. The rock fragments from this location are all impact melt breccias – similar to the adjacent boulder.

### Petrography

72501 is one of the soils that Papike et al. (1982) considered a “reference” soil. It is a mature soil with maturity index  $I_s/FeO = 81$  (Morris 1978) and high agglutinate content. The grain size distribution was determined by Butler and King (1974) and Green et al. (1975) and the mineralogic mode given by Heiken and McKay (1974) and Simon et al. (1981). Bence et al. (1974) studied several coarse-fines from 72503 (figure 4).

### Chemistry

This is an Al-rich and Fe-poor soil (figure 1), derived from feldspathic impact melt rocks from high up on the South Massif (rim of Serenitatis basin?). Laul et al. (1981) also reported the composition as function of grain size. The rare earth pattern is distinctive of a high KREEP component (figure 3).

LSPET (1973), Moore et al. (1974) and DesMarais et al. (1975) reported 125 and 135 ppm carbon, respectively. Müller (1974) determined nitrogen = 70 ppm. Norris et al. (1983) reported carbon = 109 ppm and nitrogen = 94 ppm in 72501. Most carbon and nitrogen are implanted by the solar wind, and are a measure of soil maturity (figure 2).

### Radiogenic age dating

Numerous particles from 72500 have been dated by Schaeffer and Husain (1974).

### Summary of Age Data for 72503

Ar/Ar

Bence et al. 1974     $3.96 \pm 0.02$  b.y.

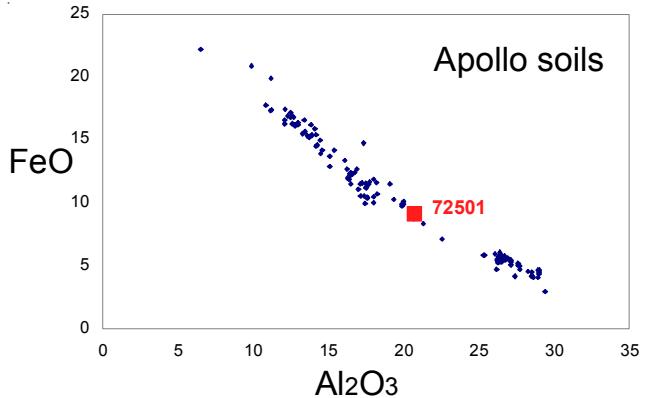


Figure 1: Composition of 72501 (landslide) compared with other lunar soils.

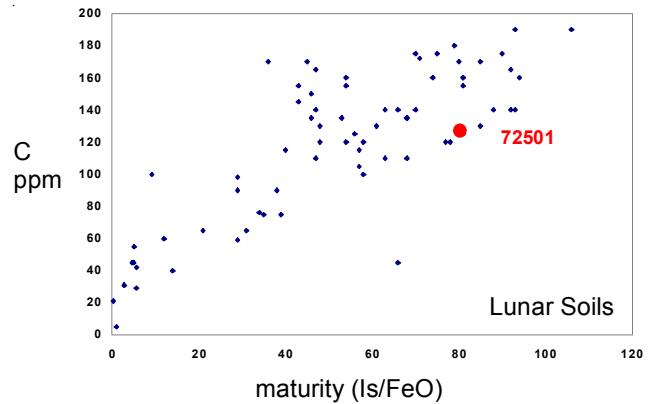


Figure 2: Carbon content and maturity index for 72501 compared with other lunar soil samples.

### Mineralogical Mode for 72501

	Simon et al. 1981 (90 to 1000 micron)	Heiken 1974 (90 to 150 micron)
Mare basalt	2.9	3.3
feldspathic basalt	0.2	2.7
anorthosite, norite	5.2	8.7
breccias, light	2.4	12.6
poikilitic breccias	9.7	
mafic mineral	5.2	6
plagioclase	10.9	6.3
opaque	0.1	0.3
glass	3	3.4
agglutinate	37.6	48
dark breccias	22.6	8.3

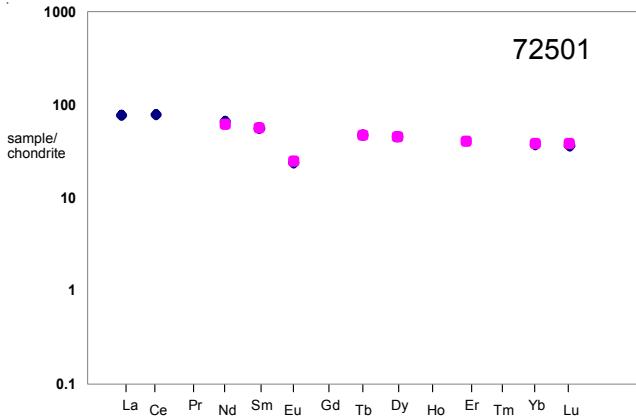


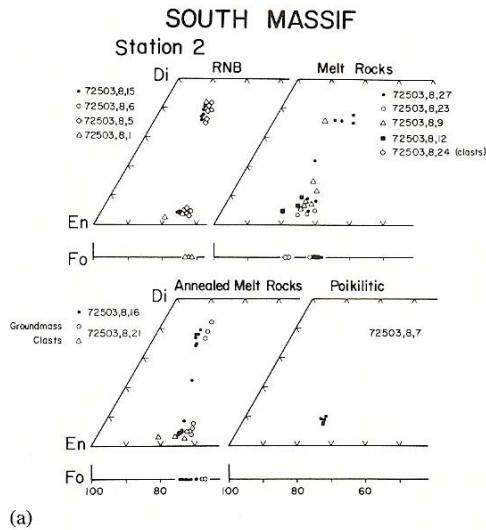
Figure 3: Normalized rare-earth-element diagram for 72501.

### Cosmogenic isotopes and exposure ages

Goswami and Lal (1974) determined the SCR track density.

### Other Studies

Hua et al. (1976) determined the ultraviolet spectra.



(a)

Figure 4: Pyroxenes in several particles from soil 72500 (Bence et al. 1974).

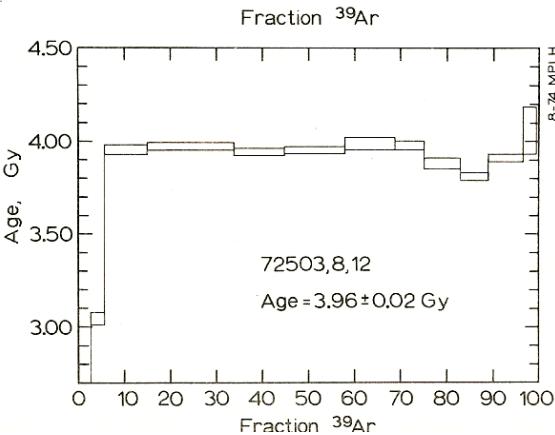
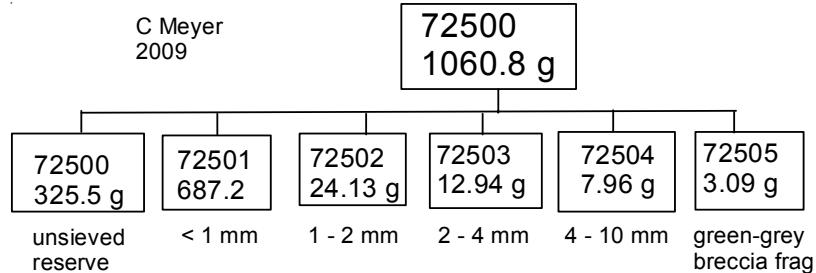


Figure 5: Ar age plateau for coarse-fine particle from 72503 (Schaeffer and Husain 1974).



**Table 1. Chemical composition of 72501.**

reference	Laul74		Laul 81		LSPET73		Philpotts74	Chou76
	weight	SiO <sub>2</sub> %			Rhodes74	Wiesmann76		
TiO <sub>2</sub>	1.5	1.7	(a)	45.2	1.4	45.12	1.56	1.55 (b)
Al <sub>2</sub> O <sub>3</sub>	20.7	21	(a)	20.1	20.1	20.64	20.63	(b)
FeO	8.6	8.6	(a)	9.5	8.77	8.74	(b)	8.62 (a)
MnO	0.112	0.114	(a)	0.12	0.11	0.13	(b)	0.125 (a)
MgO	10	10	(a)	10	10.08	9.87	(b)	
CaO	12.6	12.8	(a)	12.5	12.86	12.84	(b)	
Na <sub>2</sub> O	0.47	0.49	(a)	0.44	0.4	0.46	(b)	
K <sub>2</sub> O	0.16	0.16	(a)	0.17	0.164	0.15	(c )	0.17 (c ) 0.16 (a)
P <sub>2</sub> O <sub>5</sub>					0.09	0.06	(b)	
S %								
<i>sum</i>								
Sc ppm	18	18	(a)	20	(a)			19 (a)
V	45	50	(a)	45	(a)			
Cr	1437	1485	(a)	1573	1476		(c )	1450 (a)
Co	31	35	(a)	33	(a)			32 (a)
Ni	250	340	(a)	260	241	231	(b)	293 (a)
Cu					21	21	(b)	
Zn								
Ga								
Ge ppb								
As								
Se								
Rb					4.077			
Sr				160	(a) 155		(c ) 4.6	(c )
Y					64	63	(c ) 155	(c )
Zr	220	200	(a)		259		(b)	
Nb					18	18	(c ) 288	(c )
Mo								
Ru								
Rh								
Pd ppb								
Ag ppb								
Cd ppb								
In ppb								
Sn ppb								
Sb ppb								
Te ppb								
Cs ppm								
Ba	190	170	(a)	210	(a) 200		(c ) 211	(c ) 186 (a)
La	18	17.8	(a)	16.2	(a) 17.1		(c )	17.1 (a)
Ce	47	47	(a)	46	(a) 44.6		(c )	47 (a)
Pr								
Nd	30	31	(a)	29	(a)		27.8	(c ) 29 (a)
Sm	8.2	8.3	(a)	8	(a) 8.18		(c ) 8.18	(c ) 8.1 (a)
Eu	1.33	1.32	(a)	1.3	(a) 1.33		(c ) 1.38	(c ) 1.37 (a)
Gd					10.4		(c ) 9.74	(c )
Tb	1.7	1.6	(a)	1.6	(a)			1.7 (a)
Dy	11	11	(a)	10	(a) 11.1		(c ) 11	(c ) 11 (a)
Ho								
Er					6.58		(c ) 6.33	(c )
Tm					0.84	(a)		
Yb	6	6.2	(a)	5.9	(a) 6.15		(c ) 6.14	(c ) 6 (a)
Lu	0.87	0.84	(a)	0.82	(a)		0.929	(c ) 0.91 (a)
Hf	6.1	6.1	(a)	6	(a)			7 (a)
Ta	0.84	0.84	(a)	0.9	(a)			0.86 (a)
W ppb								
Re ppb								
Os ppb								
Ir ppb	8	10	(a)				9	(a)
Pt ppb								
Au ppb	4	5	(a)				5.5	(a)
Th ppm	2.9	3	(a)	3	(a) 3.14		(c )	2.8 (a)
U ppm	1	1	(a)	1	(a) 0.87		(c )	

technique: (a) INAA, (b) XRF, (c) IDMS

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